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EXAMINER	
WANG, QUAN ZHEN	
ART UNIT	PAPER NUMBER
2613	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/15/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/780,830	BERGANO, NEAL S.	
	Examiner	Art Unit	
	Quan-Zhen Wang	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-104* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-104* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 February 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/7/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. When applicant files a continuation-in-part whose claims are not supported by the parent application, the effective filing date is the filing date of the child CIP. Any prior art disclosing the invention or an obvious variant thereof having a critical reference date more than 1 year prior to the filing date of the child will bar the issuance of a patent under 35 U.S.C. 102(b). Paperless Accounting v. Bay Area Rapid Transit System, 804 F.2d 659, 665, 231 USPQ 649, 653 (Fed. Cir. 1986).

For the instant case, the claimed "DPSK modulation format" is not supported by the parent applications. Therefore, the effective filing date of the claims involving "DPSK modulation format" is the filing data of the current application, February 18, 2004.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "means for measuring a predetermined characteristic of a received signal" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate

prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 10-13, 16-18, 28-29, 32-34, 56, 64-66, and 73 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Taga et al. (U.S. Patent US 5,872,647).

Regarding claims 1 and 56, Taga discloses an apparatus comprising: an optical signal source (fig. 1, light source 1) configured to generate an optical signal; a data modulator (fig. 1, data modulator 3) coupled to said optical signal source and configured to modulate data on said optical signal at a data modulation frequency; and an amplitude modulator (fig. 1, modulator 2) coupled to said optical signal source and configured to provide a periodic modulation of the intensity of said optical signal.

Regarding claims 10 and 64, Taga further teaches that the amplitude modulator is driven by a sinusoidal signal to modulate the intensity of the optical signal (column 2, lines 52-56).

Regarding claims 11-12, and 65-66, Taga further teaches modulating the intensity of the optical signal at an amplitude modulation frequency phase locked to the data modulation frequency (column 2, line 49-column 3, line 8).

Regarding claim 13, Taga further teaches that the data modulation frequency is established by a clock coupled to the amplitude modulator (fig. 1).

Regarding claim 16, Taga further teaches that the amplitude modulator modulates the amplitude of the optical signal at the data modulation frequency with a prescribed phase (fig. 1, phase adjusting unit 6).

Regarding claim 17-18, Taga further teaches that the system further comprising a clock for establishing the data modulation frequency and an electrical variable-delay line (fig. 1, phase adjusting unit 6) coupling the clock to the amplitude modulator for selectively varying the prescribed phase; and the electrical variable-delay line is a phase shifter.

Regarding claims 28-29, and 73, Taga further teaches that system further comprising a polarization modulator (polarization scrambler 4) coupled to the data modulator for modulating the state of polarization of the optical signal at the data modulation frequency such that an average value of the state of polarization over a modulation cycle is substantially equal to zero.

Regarding claim 32, Taga further teaches that the amplitude modulator modulates the amplitude of the optical signal at the data modulation frequency with a prescribed phase (fig. 1, phase adjusting unit 8).

Regarding claim 33, Taga further teaches that the system further comprising an electrical variable-delay line (fig. 1, phase adjusting unit 8) coupled to the polarization modulator for selectively varying the prescribed phase.

Regarding claim 34, Taga further teaches that the system further comprising a clock for establishing the data modulation frequency and an electrical variable-delay line (fig. 1, phase adjusting unit 8) coupling the clock to the polarization modulator for selectively varying the prescribed phase; and the electrical variable-delay line is a phase shifter.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 3, 5-9, 14-15, 19, 31, 58, 60-63, and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taga et al. (U.S. Patent US 5,872,647).

Regarding claims 3, 5-8, 19, 58, 60-63, and 67, Taga does not disclose expressly that the modulation depth changes from 20% to 100%. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use any kind of detector in order to detect the incident beam, where the claimed differences involved to the substitution of interchangeable or replaceable equivalents and the reason for the selection of one equivalent for another was not to solve an existent problem, such substitution has been judicially determined to have been obvious. *In re Ruff, 118, USPQ, 343 (CCPA 1958)*. This supporting is based on a recognition that the claimed difference exist not a result of an attempt by applicant to solve a problem but merely amounts to selection of expedients known to the artisan of ordinary skill as design choices.

Regarding claim 9, Taga discloses the claimed invention except for that the amplitude modulation is directly coupled to the optical signal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to couple the amplitude modulation through the data modulation, since it has been held that rearranging parts of an-invention involves only routine skill in the art. *In re Japikse, 86 USPQ 70.*

Regarding claim 14, Taga differs from the claimed invention in that Taga does not specifically teach that the optical signal generator comprises continuous wave generator. However, the Examiner takes Official Notice that it is well known in the art to

include a laser in a light source of an optical transmitter. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to include continuous wave generator in the light source of Taga in order to generate strong optical signals.

Regarding claim 15, Taga differs from the claimed invention in that Taga does not specifically teach that the optical signal generator comprises a laser. However, the Examiner takes Official Notice that it is well known in the art to include a laser in a light source of an optical transmitter. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to include a laser in the light source of Taga in order to generate strong optical signals at a given wavelength.

Regarding claim 31, Taga differs from the claimed invention in that Taga does not specifically teach that the polarization modulator modulates the state of polarization by tracing the polarization of the optical signal along at least a portion of a Poincare sphere. However, the Examiner takes Official Notice that it is well known in the art to modulate the state of polarization by tracing the polarization of an optical signal along at least a portion of a Poincare sphere. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to modulate the state of polarization by tracing the polarization of an optical signal along at least a portion of a Poincare sphere in the apparatus of Taga in order to generate polarization independent modulated optical signals.

7. Claims 2, 4, 35-45, 51-55, 57, 59, 74-89, 99, and 101-104 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taga et al. (U.S. Patent US 5,872,647) in view Meissner et al. (U.S. Patent US 5,060,311).

Regarding claims 2, 4, 35, 57, and 59,Taga has been discusses above in regard with claims 1, 3, and 58. Taga differs from the claimed invention in that Taga does not specifically disclose using a DPSK modulation format for the data modulation. However, it is well known in the art to use a DPSK modulation format for data modulation. Foe example, Meissner discloses using a DPSK modulation format for the data modulation in an optical communication system (column 1, lines 58-63). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate the data modulation technique of Meissner in the system of Taga in order to simplify the system by eliminating the need for coherent reference signal.

Regarding claims 36-40 and 45, Taga and Meissner do not disclose expressly that the modulation depth changes from 20% to 100%. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use any kind of detector in order to detect the incident beam, where the claimed differences involved to the substitution of interchangeable or replaceable equivalents and the reason for the selection of one equivalent for another was not to solve an existent problem, such substitution has been judicially determined to have been obvious. *In re Ruff, 118, USPQ, 343 (CCPA 1958).* This supporting is based on a recognition that the claimed difference exist not a result of an attempt by applicant to solve a problem but

merely amounts to selection of expedients known to the artisan of ordinary skill as design choices.

Regarding claim 41, Taga and Meissner discloses the claimed invention except for that the amplitude modulation is directly coupled to the optical signal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to couple the amplitude modulation through the data modulation, since it has been held that rearranging parts of an-invention involves only routine skill in the art. *In re Japikse, 86 USPQ 70.*

Regarding claim 42, Taga further teaches that the amplitude modulator is driven by a sinusoidal signal to modulate the intensity of the optical signal (column 2, lines 52-56).

Regarding claim 43, Taga further teaches that the amplitude modulator modulates the amplitude of the optical signal at the data modulation frequency with a prescribed phase (fig. 1, phase adjusting unit 6).

Regarding claim 44, Taga further teaches that the system further comprising a clock for establishing the data modulation frequency and an electrical variable-delay line (fig. 1, phase adjusting unit 6) coupling the clock to the amplitude modulator for selectively varying the prescribed phase.

Regarding claims 51-52, Taga further teaches that system further comprising a polarization modulator (polarization scrambler 4) coupled to the data modulator for modulating the state of polarization of the optical signal at the data modulation

frequency such that an average value of the state of polarization over a modulation cycle is substantially equal to zero.

Regarding claims 53, Taga and Meissner differs from the claimed invention in that Taga and Meissner do not specifically teach that the polarization modulator modulates the state of polarization by tracing the polarization of the optical signal along at least a portion of a Poincare sphere. However, the Examiner takes Official Notice that it is well known in the art to modulate the state of polarization by tracing the polarization of an optical signal along at least a portion of a Poincare sphere. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to modulate the state of polarization by tracing the polarization of an optical signal along at least a portion of a Poincare sphere in the modified apparatus of Taga and Meissner in order to generate polarization independent modulated optical signals.

Regarding claim 54, Taga further teaches that the amplitude modulator modulates the amplitude of the optical signal at the data modulation frequency with a prescribed phase (fig. 1, phase adjusting unit 8).

Regarding claim 55, Taga further teaches that the system further comprising an electrical variable-delay line (fig. 1, phase adjusting unit 8) coupled to the polarization modulator for selectively varying the prescribed phase.

Regarding claim 74, Taga has been discusses above in regard with claims 1 and 56. Taga differs from the claimed invention in that Taga does not specifically disclose that the system includes a receiver. However, it is well known in the art to include a

receiver to receive signals in a communication system. Foe example, Meissner discloses a receiver to receive signals in a communication system (fig. 1). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate a receiver, as it is taught by Meissner with the system of Taga in order to receiver the transmitted signals.

Regarding claims 75, 77, and 86,Taga has been discusses above in regard with claims 1, 3, and 58. Taga differs from the claimed invention in that Taga does not specifically disclose using a DPSK modulation format for the data modulation. However, it is well known in the art to use a DPSK modulation format for data modulation. Foe example, Meissner discloses using a DPSK modulation format for the data modulation in an optical communication system (column 1, lines 58-63). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate the data modulation technique of Meissner in the system of Taga in order to simplify the system by eliminating the need for coherent reference signal.

Regarding claims 76, 78-81, and 87 Taga does not disclose expressly that the modulation depth changes from 20% to 100%. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use any kind of detector in order to detect the incident beam, where the claimed differences involved to the substitution of interchangeable or replaceable equivalents and the reason for the selection of one equivalent for another was not to solve an existent problem, such substitution has been judicially determined to have been obvious. *In re Ruff, 118,*

USPQ, 343 (CCPA 1958). This supporting is based on a recognition that the claimed difference exist not a result of an attempt by applicant to solve a problem but merely amounts to selection of expedients known to the artisan of ordinary skill as design choices.

Regarding claim 82, Taga further teaches that the amplitude modulator is driven by a sinusoidal signal to modulate the intensity of the optical signal (column 2, lines 52-56).

Regarding claims 83-84, Taga further teaches modulating the intensity of the optical signal at an amplitude modulation frequency phase locked to the data modulation frequency (column 2, line 49-column 3, line 8).

Regarding claims 85, and 102, the modified system of Taga and Meissner further discloses means for transmitting predetermined characteristic to the transmitter (Taga: fig. 3), and means for selectively varying the periodic modulation imparted to the optical signal (Taga: fig. 1, phase adjusting unit 6); and means for measuring characteristic of the received signal (Meissner: fig. 1, DEM).

Regarding claims 88-89, and 103-104, Taga further discloses that signal-to-noise-ration (fig. 2, power ratio between the peak and bottom of the RZ pulse) and Q-factor (Q-value) are used for the predetermined characteristic.

Regarding claim 99, Taga further teaches that system further comprising a polarization modulator (polarization scrambler 4) coupled to the data modulator for modulating the state of polarization of the optical signal at the data modulation

frequency such that an average value of the state of polarization over a modulation cycle is substantially equal to zero.

Regarding claim 101, Taga and Meissner differ from the claimed invention in that Taga and Meissner do not specifically teach that the polarization modulator modulates the state of polarization by tracing the polarization of the optical signal along at least a portion of a Poincare sphere. However, the Examiner takes Official Notice that it is well known in the art to modulate the state of polarization by tracing the polarization of an optical signal along at least a portion of a Poincare sphere. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to modulate the state of polarization by tracing the polarization of an optical signal along at least a portion of a Poincare sphere in the apparatus of Taga and Meissner in order to generate polarization independent modulated optical signals.

8. Claims 20, 22-27, and 69-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taga et al. (U.S. Patent US 5,872,647) in view of Kitajima et al. (U.S. Patent US 5,515,196).

Regarding claims 20, and 69, Taga differs from the claimed invention in that Taga does not specifically teach that the system further comprises a phase modulator coupled to the data modulator, the phase modulator configured to provide optical phase modulation to the optical signal. However, it is well known in the art to include a phase modulator in an optical transmitter to modulate the phase of the optical signal to be transmitted. For example, Kitajima discloses an optical transmitter apparatus

comprising a phase modulator in an optical transmitter to modulate the phase of the optical signal to be transmitted (fig. 13). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate a phase modulator, as it is taught by Kitajima, in the optical transmitter apparatus of Taga to modulate the phase of the optical signal to be transmitted in order to reduce the time jitter of the optical signal caused by the influence of dispersion.

Regarding claims 22-24, and 70-71, Kitajima further teaches that the apparatus further comprising a clock for establishing the data modulation frequency, and wherein the clock is coupled to the phase modulator so that the phase modulator provides optical phase modulation at a frequency that is phase locked and equal to the data modulation frequency (fig. 13).

Regarding claims 25-27, and 72, the modified system of the modified system of Taga and Kitajima differs from the claimed invention in that Taga and Kitajima do not specifically disclose that the apparatus further comprising an electrical variable-delay line coupling the clock to the phase modulator for selectively varying the phase of the optical phase modulation provided by the phase modulator, and the electrical variable-delay line is a phase shifter, and the phase modulator provides phase modulation at a frequency that is phase locked and equal to the data modulation. However, Taga discloses an electrical variable-delay line coupling the clock to the amplitude modulator for selectively varying the phase of the optical phase modulation provided by the phase modulator, and the electrical variable-delay line is a phase shifter. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was

made to incorporate an electrical variable-delay line coupling the clock to the phase modulator for selectively varying the phase of the optical phase modulation provided by the phase modulator, and the electrical variable-delay line is a phase shifter, and the phase modulator provides phase modulation at a frequency that is phase locked and equal to the data modulation in order to synchronize the data modulation and the phase modulation.

9. Claims 46-50, and 90-98 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taga et al. (U.S. Patent US 5,872,647) in view of Meissner et al. (U.S. Patent US 5,060,311) and further in view of Kitajima et al. (U.S. Patent US 5,515,196).

Regarding claim 46, the modified system of Taga and Meissner differs from the claimed invention in that Taga and Meissner do not specifically teach that the system further comprises a phase modulator coupled to the data modulator, the phase modulator configured to provide optical phase modulation to the optical signal. However, it is well known in the art to include a phase modulator in an optical transmitter to modulate the phase of the optical signal to be transmitted. For example, Kitajima discloses an optical transmitter apparatus comprising a phase modulator in an optical transmitter to modulate the phase of the optical signal to be transmitted (fig. 13). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate a phase modulator, as it is taught by Kitajima, in the modified system of Taga and Meissner to modulate the phase of the

optical signal to be transmitted in order to reduce the time jitter of the optical signal caused by the influence of dispersion.

Regarding claims 47-48, Kitajima further teaches that the apparatus further comprising a clock for establishing the data modulation frequency, and wherein the clock is coupled to the phase modulator so that the phase modulator provides optical phase modulation at a frequency that is phase locked and equal to the data modulation frequency (fig. 13).

Regarding claims 49-50, the modified system of the modified system of Taga, Meissner, and Kitajima differs from the claimed invention in that Taga, Meissner, and Kitajima do not specifically disclose that the apparatus further comprising an electrical variable-delay line coupling the clock to the phase modulator for selectively varying the phase of the optical phase modulation provided by the phase modulator, and the electrical variable-delay line is a phase shifter, and the phase modulator provides phase modulation at a frequency that is phase locked and equal to the data modulation. However, Taga discloses an electrical variable-delay line coupling the clock to the amplitude modulator for selectively varying the phase of the optical phase modulation provided by the phase modulator, and the electrical variable-delay line is a phase shifter. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate an electrical variable-delay line coupling the clock to the phase modulator for selectively varying the phase of the optical phase modulation provided by the phase modulator, and the electrical variable-delay line is a phase shifter, and the phase modulator provides phase modulation at a

frequency that is phase locked and equal to the data modulation in order to synchronize the data modulation and the phase modulation.

Regarding claim 90, Taga and Meissner differ from the claimed invention in that Taga and Meissner do not specifically teach that the system further comprises a phase modulator coupled to the data modulator, the phase modulator configured to provide optical phase modulation to the optical signal. However, it is well known in the art to include a phase modulator in an optical transmitter to modulate the phase of the optical signal to be transmitted. For example, Kitajima discloses an optical transmitter apparatus comprising a phase modulator in an optical transmitter to modulate the phase of the optical signal to be transmitted (fig. 13). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate a phase modulator, as it is taught by Kitajima, in the optical transmitter apparatus of Taga and Meissner to modulate the phase of the optical signal to be transmitted in order to reduce the time jitter of the optical signal caused by the influence of dispersion.

Regarding claims 91-92, Kitajima further teaches that the apparatus further comprising a clock for establishing the data modulation frequency, and wherein the clock is coupled to the phase modulator so that the phase modulator provides optical phase modulation at a frequency that is phase locked and equal to the data modulation frequency (fig. 13).

Regarding claim 93 Taga does not disclose expressly that the modulation depth changes from 20% to 100%. However, it would have been obvious to one having

ordinary skill in the art at the time the invention was made to use any kind of detector in order to detect the incident beam, where the claimed differences involved to the substitution of interchangeable or replaceable equivalents and the reason for the selection of one equivalent for another was not to solve an existent problem, such substitution has been judicially determined to have been obvious. *In re Ruff, 118, USPQ, 343 (CCPA 1958).* This supporting is based on a recognition that the claimed difference exist not a result of an attempt by applicant to solve a problem but merely amounts to selection of expedients known to the artisan of ordinary skill as design choices.

Regarding claim 94, the modified system of the modified system of Taga, Meissner and Kitajima differs from the claimed invention in that Taga, Meissner and Kitajima do not specifically disclose that the apparatus further comprising an electrical variable-delay line coupling the clock to the phase modulator for selectively varying the phase of the optical phase modulation provided by the phase modulator, and the electrical variable-delay line is a phase shifter, and the phase modulator provides phase modulation at a frequency that is phase locked and equal to the data modulation. However, Taga discloses an electrical variable-delay line coupling the clock to the amplitude modulator for selectively varying the phase of the optical phase modulation provided by the phase modulator, and the electrical variable-delay line is a phase shifter. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate an electrical variable-delay line coupling the clock to the phase modulator for selectively varying the phase of the optical

phase modulation provided by the phase modulator, and the electrical variable-delay line is a phase shifter, and the phase modulator provides phase modulation at a frequency that is phase locked and equal to the data modulation in order to synchronize the data modulation and the phase modulation.

Regarding claim 95, the modified system of Taga and Meissner further discloses means for transmitting predetermined characteristic to the transmitter (Taga: fig. 3), and means for selectively varying the periodic modulation imparted to the optical signal (Taga: fig. 1, phase adjusting unit 6); and means for measuring characteristic of the received signal (Meissner: fig. 1, DEM).

Regarding claim 96, Meissner further discloses using a DPSK modulation format for the data modulation in an optical communication system (column 1, lines 58-63).

Regarding claims 97-98, Taga further discloses that signal-to-noise-ration (fig. 2, power ratio between the peak and bottom of the RZ pulse) and Q-factor (Q-value) are used for the predetermined characteristic.

10. Claim 100 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taga et al. (U.S. Patent US 5,872,647) in view of Meissner et al. (U.S. Patent US 5,060,311) and further in view of Takayama et al. (K. Takayama et al., "An all-optical 10-GHz LD-based clock regenerator using a Mach-Zehnder interferometer-type NRZ-RZ converter", *Tech digest* of *ECOC* '91, vol. MoC1-2, pp. 77-80, September 1991).

Regarding claim 30, Taga and Meissner discloses the claimed invention except that Taga and Meissner do not specifically teach that the polarization modulator is

coupled to the data modulator through the amplitude modulator. However, it is well known in the art to use an amplitude modulator following a data modulator. For example, Takayama discloses that the amplitude modulator (fig. 1, Mach-Zehnder interferometer) is arranged to follow the data modulator (not shown in the figure). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to arrange the amplitude modulator following the data modulator in the system of Taga and Meissner and, therefore, the polarization modulator is coupled to the data modulator through the amplitude modulator. One ordinary skill in the art would be motivated to do so in order to generate RZ signals from NRZ signals.

11. Claims 21, 30, and 68is rejected under 35 U.S.C. 103(a) as being unpatentable over Taga et al. (U.S. Patent US 5,872,647) in view of Kitajima et al. (U.S. Patent US 5,515,196) and further in view of Takayama et al. (K. Takayama et al., "An all-optical 10-GHz LD-based clock regenerator using a Mach-Zehnder interferometer-type NRZ-RZ converter", *Tech digest* of *ECOC* '91, vol. MoC1-2, pp. 77-80, September 1991).

Regarding claims 21 and 68, the modified system of Taga and Kitajima discloses the claimed invention except that Taga and Kitajima do not specifically teach that the polarization modulator is coupled to the data modulator through the amplitude modulator. However, it is well known in the art to use an amplitude modulator following a data modulator. For example, Takayama discloses that the amplitude modulator (fig. 1, Mach-Zehnder interferometer) is arranged to follow the data modulator (not shown in

the figure). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to arrange the amplitude modulator following the data modulator in the modified system of Taga and Kitajima, and, therefore, the polarization modulator is coupled to the data modulator through the amplitude modulator. One ordinary skill in the art would be motivated to do so in order to generate RZ signals from NRZ signals.

Regarding claim 30, Taga discloses the claimed invention except that Taga does not specifically teach that the polarization modulator is coupled to the data modulator through the amplitude modulator. However, it is well known in the art to use an amplitude modulator following a data modulator. For example, Takayama discloses that the amplitude modulator (fig. 1, Mach-Zehnder interferometer) is arranged to follow the data modulator (not shown in the figure). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to arrange the amplitude modulator following the data modulator in the system of Taga and, therefore, the polarization modulator is coupled to the data modulator through the amplitude modulator. One ordinary skill in the art would be motivated to do so in order to generate RZ signals from NRZ signals.

Double Patenting

12. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent

and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

13. Claims 1 and 56 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 5,946,119.

Although the conflicting claims are not identical, they are not patentably distinct from each other because claims in the continuation are broader that the patented

claims, In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982) and In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993), broad claims in the instant application are rejected as obvious double patenting over narrow claims of copending Application. For example, claim 1 of the present invention does not claim the specific features of "a clock coupled to said amplitude modulator and said data modulator, said clock having a frequency that determines the modulation frequency of the amplitude modulator, said frequency of the clock being phase locked and equal to said predetermined frequency". Therefore, claim 1 of the instant invention is broader than claim 1 of the copending Application.

14. Claims 1 and 56 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 of U.S. Patent No. 6,556,326 B2.

Although the conflicting claims are not identical, they are not patentably distinct from each other because claims in the continuation are broader that the patented claims, In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982) and In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993), broad claims in the instant application are rejected as obvious double patenting over narrow claims of copending Application. For example, claim 1 of the present invention does not claim the specific features of "a clock coupled to said amplitude modulator and said data modulator, said clock having a frequency that determines the modulation frequency of the amplitude modulator, said frequency of the clock being phase locked and equal to said

predetermined frequency". Therefore, claim 1 of the instant invention is broader than claim 1 of the copending Application.

15. Claims 1 and 56 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 of U.S. Patent No. 6,744,992 B2.

Although the conflicting claims are not identical, they are not patentably distinct from each other because claims in the continuation are broader that the patented claims, In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982) and In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993), broad claims in the instant application are rejected as obvious double patenting over narrow claims of copending Application. For example, claim 1 of the present invention does not claim the specific features of "a clock coupled to said amplitude modulator and said data modulator, said clock having a frequency that determines the modulation frequency of the amplitude modulator, said frequency of the clock being phase locked and equal to said predetermined frequency". Therefore, claim 1 of the instant invention is broader than claim 1 of the copending Application.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quan-Zhen Wang whose telephone number is (571) 272-3114. The examiner can normally be reached on 9:00 AM - 5:00 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

qzw
2/10/2007

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